

# U.S. FISH AND WILDLIFE SERVICE SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

**Scientific Name:**

*Hypolimnas octocula mariannensis*

**Common Name:**

Mariana Eight-Spot butterfly

**Lead region:**

Region 1 (Pacific Region)

**Information current as of:**

06/01/2013

**Status/Action**

☐ Funding provided for a proposed rule. Assessment not updated.

☐ Species Assessment - determined species did not meet the definition of the endangered or threatened under the Act and, therefore, was not elevated to the Candidate status.

☐ New Candidate

☒ Continuing Candidate

☐ Candidate Removal

☐ Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status

☐ Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species

☐ Range is no longer a U.S. territory

☐ Insufficient information exists on biological vulnerability and threats to support listing

☐ Taxon mistakenly included in past notice of review

☐ Taxon does not meet the definition of "species"

☐ Taxon believed to be extinct

☐ Conservation efforts have removed or reduced threats

\_\_\_ More abundant than believed, diminished threats, or threats eliminated.

## **Petition Information**

\_\_\_ Non-Petitioned

X Petitioned - Date petition received: 05/11/2004

90-Day Positive:05/11/2005

12 Month Positive:05/11/2005

Did the Petition request a reclassification? **No**

### **For Petitioned Candidate species:**

Is the listing warranted(if yes, see summary threats below) **Yes**

To Date, has publication of the proposal to list been precluded by other higher priority listing?  
**Yes**

Explanation of why precluded:

Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for this species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The Progress on Revising the Lists section of the current CNOR (<http://endangered.fws.gov/>) provides information on listing actions taken during the last 12 months.

## **Historical States/Territories/Countries of Occurrence:**

- **States/US Territories:** Guam, Northern Mariana Islands
- **US Counties:** Guam, GU, Saipan, MP
- **Countries:**Country information not available

## **Current States/Counties/Territories/Countries of Occurrence:**

- **States/US Territories:** Guam, Northern Mariana Islands
- **US Counties:** Guam, GU, Saipan, MP
- **Countries:** United States

## **Land Ownership:**

The 10 known sites that support populations of this butterfly include privately-owned lands (three populations), the Government of Guam (one population), and the U.S. Department of Defense (DOD) (six populations).

## **Lead Region Contact:**

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## **Lead Field Office Contact:**

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## **Biological Information**

### **Species Description:**

The Mariana eight-spot butterfly (*Hypolimnys octocula marianensis*) is endemic to the islands of Guam and Saipan in the Mariana archipelago. Like most nymphalid butterflies, orange and black are the two primary colors exhibited by this subspecies. The males are smaller than the females by at least a third or more in size. Males are predominantly black with an orange stripe running vertically on each wing. The stripe on the hindwings exhibits small black dots in a vertical row. Overall, the females appear more orange in color than the males, and black bands across the apical (top) margins of both pair of wings are exhibited. Along the inner margin of these black bands, large white spots are exhibited across the entire length of the wings (Swezey 1942). The caterpillar larva of this species is black in color with red-colored spikes and a black head. It can be differentiated by its black-colored head and red spines from similar appearing caterpillars including *Hypolimnys bolina*, *H. anomala*, and *Pipturus* spp. (Schreiner and Nafus 1996, p. 10; Schreiner and Nafus 1997, p. 26).

### **Taxonomy:**

This subspecies was originally described by Butler and is recognized as a distinct taxon (Swezey 1942). Swezey (1942) is the most recent and accepted taxonomy for this species.

### **Habitat/Life History:**

The larvae of this butterfly feed on two native plants, *Procris pedunculata* (the original recorded host plant) and *Elatostema calcareum* (also discovered to be a host during surveys in 1995) (Schreiner and Nafus, 1996, p. 1). Both of these forest herbs (Family Urticaceae) grow only on karst limestone (Schreiner and Nafus 1996, p. 1; Rubinoff, in litt. 2013, p. 1). The overall status, including range, number of populations, and population density, of these two plants currently remains relatively unknown. Neither host plant species is known to be common in their range and both are believed to be susceptible to feral ungulate grazing based upon anecdotal observations indicating that they only occur in the extremely rugged limestone karst terrain found on portions of Guam and the CNMI and believed to be avoided by most ungulates (Rubinoff, in litt. 2013, p. 1). During surveys for the Mariana eight-spot butterfly and its host plants in 2011 and 2013, researchers generally found some evidence of the butterflies on host plants including eggs and empty pupal cases. When adult butterflies were observed, they were always in proximity to the host plants (Rubinoff, in litt. 2011, pp. 1-2; 2013, p. 1).

### **Historical Range/Distribution:**

The Mariana eight-spot butterfly is historically known from limestone karst forest habitat on Saipan and Guam.

### **Current Range Distribution:**

The most extensive and thorough historical surveys for the Mariana eight-spot butterfly occurred in 1995 on Guam, Rota, and Saipan (Schreiner and Nafus 1996, p. 2). On Saipan, several areas including the base below

Suicide Cliff and Kalebrera Cave were discovered to support healthy populations of the host plant, *Procris pedunculata*, but no Mariana eight-spot butterflies were seen and the researchers believed the species may have been extirpated on Saipan (Schreiner and Nafus 1996, p. 2; Schreiner and Nafus 1997, p. 26).

Surveys in 1995 on Rota Island (not a known historical population locality) revealed both host plant species to be abundant, particularly *Elatostema calcareum*, at several karst limestone forest habitat sites including behind the historic Japanese gun site, along the road to Sabana. However, neither the eggs, larvae, nor adults of the Mariana eight-spot butterfly were observed (Schreiner and Nafus 1996, p. 2).

The 1995 surveys on the island of Guam focused on the northern half of the island and located approximately eight populations at Fadian Cove, Hilaan, Mangilao (below the University of Guam), Orote (two populations), Pagat (two populations), and Tweeds Cave (Schreiner and Nafus 1996, pp. 2, 7-8). Researchers found both host plant species occurring in limestone karst habitat on the windward side of the island at roughly 61 meters (m) (200 feet (ft)) in elevation and on the leeward side of the island ranging between 30.5-61 m (100-200 ft) (Schreiner and Nafus 1996, p. 2). Schreiner and Nafus (1995, p. 2) generally found eggs of the butterfly to be uncommon, but typically observed one or more life stages at most host plant population sites. Eggs and larvae of the butterfly were noted to be more abundant on the *Elatostema calcareum* on the leeward host plant populations. In their report, the authors noted that host plant populations thought to occur in southern Guam within limestone karst forest habitat remained to be surveyed, but did not indicate if those surveys were ever completed (Schreiner and Nafus 1996, p. 2).

In November of 2000, two Fish and Wildlife Service entomologists were sent to Guam for a draft environmental impact statement to survey lands on the Guam National Wildlife Refuge at Ritidian Point and Anderson Air Force Base (AFB) for the Guam tree snail *Partula radiolata* and the Mariana eight-spot butterfly and assess the potential impacts to the species from a new road to be constructed to Jinapsan Beach. Within karst limestone forest habitat above Jinapsan Beach on Anderson AFB lands, a new population of *Elatostema calcareum* was discovered in deeply pitted karst limestone. Several individual host plants were located along with the Mariana eight-spot butterfly. Feeding damage, larval frass, three larvae, and an intact chrysalis of the butterfly were found on this host plant population (Asquith and Richardson, in litt. 2000, p. 1). Neither host plants nor any of the butterfly's life stages were observed at the Ritidian Point Guam National Wildlife Refuge despite extensive searching there along survey transects.

In July of 2009, a survey of the Pagat Route 15 on Guam found one adult, likely a male (Campora and Lee, in litt. 2009, p. 5).

In 2011, the U.S. Fish and Wildlife Service (FWS), contracted with a University of Hawaii researcher and lepidopterist to survey for the Mariana eight-spot butterfly and its host plants on FWS Refuge lands and other known or likely populations sites on both Saipan and Guam. On Saipan, several potential sites were surveyed and the host plant, *Procris pedunculata*, was located and found to be abundant at three different limestone karst forest habitat sites, including Laderan Tangke Trail, the Korean WWII Shrine, and the Bandero Trail. However, none of the host plants had butterfly eggs or indication of larval feeding, and the adult butterfly and the other host plant, *Elatostema calcareum*, were not observed (Rubinoff, in litt. 2011, pp. 1-2).

During the 2011 surveys on Guam, several historical population sites and several potential habitat sites were surveyed. One male Mariana eight-spot butterfly was observed at along the Route 15S Guam International Raceway site approximately 1.5 kilometer (0.93 mile) north of the trailhead to Pagat Cave (Rubinoff, in litt. 2011, p. 2). Within limestone karst forest habitat near Hilaan Point and Lost Pond, one female butterfly was observed in the canopy understory. Near the area known as Lost Cave, many host plants were observed, particularly *Procris pedunculata*, which was more common than *Elatostema calcareum*. Both host plant species were found to be growing only out of the karst limestone, and eggs, likely those of the Mariana eight-spot butterfly, were found on *P. pedunculata* (Rubinoff, in litt. 2011, p. 2).

In 2013, Rubinoff (2013, pp. 1-8) conducted several additional surveys for both the Mariana eight-spot

butterfly and the wandering Mariana butterfly (*Vagrans egistina*) on military on lands owned by the U.S. Navy and Air Force on Guam. During the surveys, approximately 18 large transects were surveyed within mostly limestone forest habitat and researchers found only two populations of the host plant species. At both populations, located in extreme karst habitat along cliff edges, a population of the Mariana eight-spot butterfly was confirmed by the presence of eggs and one or more chrysalises (Rubinoff, in litt. 2013, pp. 1-2, 7). The two populations discovered during these surveys include a site near the Northwest Field, Anderson AFB, and one site near the Route 15 International Race Track. Additionally during the surveys in March of 2013, a population of the butterfly within limestone forest habitat near Haputo Beach was confirmed by the observation of one larva and an adult female (Rubinoff, in litt. 2013, p. 1).

Rubinoff (in litt. 2013, p. 1), noted a strong presence of pigs and deer along most transects and suggests that feral ungulates may be seriously impacting the abundance of both host plant species. As Rubinoff noted in both his 2011 and 2013 surveys (in litt. 2011; 2012), the host plants are entirely restricted to extreme karst limestone habitat where ungulates may be precluded due to the incredibly rugged nature and deeply pitted terrain. Anecdotal evidence indicating that the Mariana eight-spot butterfly host plants may be restricted to extreme karst habitat is supported by other prior surveys between the 1995 and 2013 (Schreiner and Nafus 1996, p. 1-2; Asquith and Richardson, in litt. 2000, p. 1; Hawley, in litt. 2009), and this concern may certainly warrant additional research (see Recommended Conservation Measures below).

### **Population Estimates/Status:**

No quantitative estimates are given for the subspecies as a whole; however, Schreiner and Nafus (1996, p. 2) noted about their surveys that the most butterflies observed in one day was six individuals. During the same surveys, the researchers noted that one or more life stage of the Mariana eight-spot butterfly were present in most host plant populations sites. While they generally observed eggs to be rare, a total of 71 eggs were counted during one survey at the Mangilao population site and 30 eggs at the Tweeds Cave population site (Schreiner and Nafus 1996, p. 2).

## **Threats**

### **A. The present or threatened destruction, modification, or curtailment of its habitat or range:**

None known.

### **B. Overutilization for commercial, recreational, scientific, or educational purposes:**

We are currently lack any information indicating that this species is being collected for commercial, recreational, scientific, or educational purposes. However, rare butterflies and moths are highly prized by collectors (Morris et al. 1991), who often take all individuals obtainable (59 FR 18350; United States Department of Justice (DOJ), in litt. 1993). The listing of butterflies as federally endangered may increase their attractiveness to collectors of rare species (DOJ, in litt. 1993). Unrestricted collecting and handling are known to impact populations of other species of rare Lepidoptera (Murphy 1988).

### **C. Disease or predation:**

Numerous nonnative insect predators and parasitoids of Lepidoptera have become established, purposefully or adventitiously, in the Mariana Islands, including on Guam and Saipan. Some of these insects have been documented to attack and significantly impact certain species of native butterflies (Peterson 1957; Schreiner and Nafus 1986; Nafus 1989, 1992, 1993a, b, c). Schreiner and Nafus (1996, pp. 2-5) found that egg predation by ants and egg parasitism killed the majority of Mariana eight-spot butterflies studied for a year on Guam.

In the one year study, Schreiner and Nafus (1996, pp. 2-5) documented parasitism of eggs of the Mariana eight-spot butterfly by two native parasitoid wasps, *Telenomus* sp. (no common name) and *Ooencyrtus* sp. (no common name), on Guam. These wasps are tiny and likely hitch-hiked with adult female butterflies in order to access freshly laid eggs, as has been observed in related species (Woelke 2008). The wasps lay their own eggs within the butterfly eggs, thus preventing caterpillar development.

Nafus (1993a) found ants to be major predators of the eggs and larvae of the common eggfly (*Hypolimnas bolina*), a closely related butterfly species. The most commonly observed ants were dwarf pedicel ants (*Tapinoma minutum*), tropical fire ants (*Solenopsis geminata*), white-footed ants (*Technomyrmex albipes*), and bi-colored trailing ants (*Monomorium floricola*). Many ant species are known to prey on all immature stages of Lepidoptera and can completely exterminate populations (Zimmerman 1958). In the same one year study noted above, Schreiner and Nafus (1996, p. 3) found predation by nonnative ants to be one of the primary causes of mortality (>90 percent) in the Mariana eight-spot butterfly.

#### **D. The inadequacy of existing regulatory mechanisms:**

The Mariana eight-spot butterfly currently receives no protection under the federal Endangered Species Act (16 U.S.C. §1531-1544) or the CNMI Endangered Species List (Public Law 2-51 CMC 5108b). It does receive protection under the Guam Endangered Species Act (5GCA § 63205(c)).

#### **E. Other natural or manmade factors affecting its continued existence:**

The Mariana eight-spot butterfly apparently persists in extremely low numbers on Guam. This circumstance makes it vulnerable to extinction due to a variety of natural processes. Small populations are particularly vulnerable to reduced reproductive vigor caused by inbreeding depression, and they may suffer a loss of genetic variability over time due to random genetic drift, resulting in decreased evolutionary potential and ability to cope with environmental change (Lande 1988; Pimm et al. 1988; Center for Conservation Biology 1994; Mangel and Tier 1994). Small populations are also demographically vulnerable to extinction caused by random fluctuations in population size and sex ratio and to catastrophes such as typhoons (Lande 1988).

#### **Conservation Measures Planned or Implemented :**

In 2009, we provided field information sheets with color pictures and descriptions of the Mariana eight-spot butterfly and its host plants to over 20 professional staff currently working in the field on the islands of Rota, Tinian, and Saipan. The sheets request that pictures, GPS points and field notes be provided to the FWS in an effort to obtain information on this species (Hawley, FWS, in litt. 2009).

A survey led by the FWS was conducted on the island of Tinian, CNMI from June through October, 2008, to determine the presence or absence of two butterfly species, the Mariana wandering butterfly and the Mariana eight-spot butterfly. While Tinian is not known to be part of either species historical range, the likelihood of introduced pests arriving on Tinian due to an increase in sea and air transports to this island is a concern for a suite of native butterfly species, including the Mariana eight-spot butterfly. Additionally, any reduction of host plant sites for either butterfly species may be of conservation concern if translocation to Tinian is considered in future recovery or enhancement plans. While several *Elatostema calcareum* host plant population sites were identified and monitored in limestone karst forest habitat on Tinian, no life stages of the Mariana eight-spot butterfly were observed (Hawley 2009).

Surveys on Guam insect biodiversity are currently underway (Aguon, in litt. 2009). In addition, a survey for the butterfly in Pagat was conducted between July 15 and July 24, 2009. While the survey was only able to confirm the presence of one adult male, they did find eggs, larvae, one viable chrysalis, and three empty chrysalides of *Hypolimnas* spp. Unfortunately, immature life stages are difficult to distinguish and therefore unless reared to adult form cannot be confirmed (Campora and Lee 2009, pp. 3-5).

In 2011, the FWS contracted with Dr. Dan Rubinoff, a University of Hawaii lepidopterist, to conduct surveys for both the Mariana wandering butterfly and the Mariana eight-spot butterfly on Guam and Saipan. These surveys were completed in July, 2011, and the results along with a 2013 survey done for the U.S. Navy are discussed above (see Current Range and Distribution).

## Summary of Threats :

Based on our evaluation of predation and parasitism we conclude there is sufficient information to develop a proposed rule for this species due to the threat of predation by ants and parasitism by small wasps. The possible extirpation of this species from Saipan and its reduction to low numbers on Guam makes it vulnerable to random demographic and environmental events. We find that this species is warranted for listing throughout all of its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

## For species that are being removed from candidate status:

\_\_\_\_\_ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions(PECE)?

## Recommended Conservation Measures :

- Develop and implement monitoring surveys for the Mariana eight-spot butterfly
- Develop and implement monitoring surveys to better understand the status of the two host plant species; confirming whether the host plants are susceptible to feral ungulates including pigs and deer, and if so, developing and implementing control to protect the host plants
- Conduct parasite control
- Conduct ant control

## Priority Table

Magnitude	Immediacy	Taxonomy	Priority
<b>High</b>	<b>Imminent</b>	Monotypic genus	1
		Species	2
		<b>Subspecies/Population</b>	<b>3</b>
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/Population	6
Moderate to Low	Imminent	Monotype genus	7
		Species	8
		Subspecies/Population	9
	Non-Imminent	Monotype genus	10
		Species	11
		Subspecies/Population	12

## Rationale for Change in Listing Priority Number:

## **Magnitude:**

The threat to the Mariana eight-spot butterfly from predation by nonnative ants and parasitism by wasps are of high magnitude. Nonnative ants and parasitic wasps occur range-wide. The small numbers of observed individuals within population sites also make this species very susceptible to the negative effects of randomly occurring natural events such as typhoons and storms.

## **Imminence :**

The primary threat of predation by nonnative ants and parasitism by small wasps is imminent because it is ongoing.

☐ Yes ☐ Have you promptly reviewed all of the information received regarding the species for the purpose of determination whether emergency listing is needed?

## **Emergency Listing Review**

☐ No ☐ Is Emergency Listing Warranted?

The species is not considered for emergency listing at this time because the immediacy of the threats is not so great as to imperil the species within the time frame of the routine listing process. If it becomes apparent that the routine listing process is not sufficient to prevent large losses that may result in this species' extinction, then the emergency rule process for this species will be initiated. We will continue to monitor the status of the Mariana eight-spot butterfly as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

## **Description of Monitoring:**

We conducted literature searches for recent articles on this species and attempted to contact relevant species experts regarding the current status of this species. No new information on this species was found, and there is no new information on the numbers of individuals or populations, or on threats to the species.

This level of monitoring is appropriate to update the status of the species because a thorough literature search was conducted and relevant experts were contacted. Information contained in this assessment form was verified and any updated information incorporated.

The Mariana eight-spot butterfly is included in the list of species in the Guam Comprehensive Wildlife Conservation Strategy (Guam Division of Aquatic Wildlife and Resources 2005).

**Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment:**

Guam

**Indicate which State(s) did not provide any information or comment:**

Northern Mariana Islands

## **State Coordination:**

On February 22, 2013, we sent a letter to the Guam Division of Aquatic Wildlife and Resources (DAWR) and to the CNMI Division of Fish and Wildlife (DFW) requesting their review and comments on our most

recent candidate assessment of this species. On April 14, 2013 we received a letter dated March 27, 2013, from Mariquita F. Taitague, Director, Department of Agriculture. In her letter, the director expressed support for listing the Mariana eight-spot butterfly as Endangered, but offered no new information regarding the species status.

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### **Personal Communications and In Litteris**

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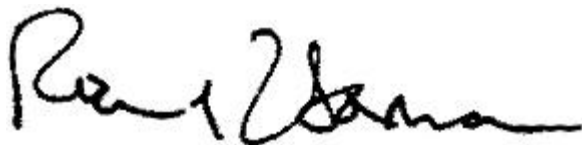
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### **Approval/Concurrence:**

Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:



06/13/2013

Date

Concur:



10/28/2013

Date

Did not concur:

\_\_\_\_\_

\_\_\_\_\_  
Date

Director's Remarks: